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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/671,116	09/24/2003	Richard Schiek	SD-7173	7257
20567	7590	02/22/2006	EXAMINER	
SANDIA CORPORATION			LIN, SUN J	
P O BOX 5800			ART UNIT	
MS-0161			PAPER NUMBER	
ALBUQUERQUE, NM 87185-0161			2825	

DATE MAILED: 02/22/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/671,116

Applicant(s)

SCHIEK, RICHARD

Examiner

Sun J. Lin

Art Unit

2825

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on Amendments & Remarks filed on 01/26/2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-32 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-32 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 09/24/2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☐ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: _____

DETAILED ACTION

1. This Office Action is in response to applicants' Amendment and Remarks filed on 01/26/2006 regarding application 10/671,116 filed on 09/24/2003. Claims 1 – 32 remain pending in the application.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

3. Claims 1 – 32 are rejected under 35 U.S.C. 102(a) as being unpatentable over IDS paper entitled “A New, Topology Driven Method for Automatic Mask Generation from Three-Dimensional Models” authored by R. Schiek and R. Schmidt (called Schiek & Schmidt hereinafter)

4. As to Claim 1, Schiek & Schmidt show and teach the following subject matter:
- A method of generating two-dimensional (2D) masks from a three-dimensional (3D) model – [title; abstract];
 - Providing a 3D model represent a MEMS (micro-electro-mechanical structure) for manufacture and a description of process mask requirements – [abstract];
 - Reducing the 3D model to a topological description of unique cross sections – [Section 3];
 - Selecting candidate masks from the unique cross sections and a cross section topology – [Section 3.2; Section 4];
 - Reconciling the candidate masks based on the description of process mask requirements to produce 2D process masks – [Section 3.2; Section 4].

For reference purposes, the explanations given above in response to Claim 1 are called [Response A] hereinafter.

5. As to Claims 22 and 32, reasons are included in [Response A] given above.
6. As to Claims 2 and 3, in addition to reasons included in [Response A] given above, Schiek & Schmidt disclose the following subject matter:
- dividing (i.e., separating) a 3D model into many non-intersecting (model) bodies (i.e., independent model bodies) – [Section 4];
 - Generate a topology tree for each of non-intersection (model) bodies (independent model bodies) – [Section 4];
 - Locating (i.e., searching) candidate non-overlapping masks for unique cross sections in the topology tree – [Section 4];
 - Summation of all candidate masks – [Section 4]; Notice that the summation is achieved by arranging the unique cross sections based on mutual topological relationship.

For reference purposes, the explanations given above in response to Claims 2 and 3 are called [Response A1] hereinafter.

7. As to Claim 4, Schiek & Schmidt teach conduction of a simplification of topology trees by combining nodes that topologically connect into one node, thereby reducing number of nodes in topology trees (i.e., topology graphs) – [Section 4].

For reference purposes, the explanations given above in response to Claim 4 are called [Response A2] hereinafter.

8. As to Claim 5, Schiek & Schmidt teach subject matter regarding selecting candidate masks based on topology trees (i.e., topology graphs) – [Section 3.2].

For reference purposes, the explanations given above in response to Claim 5 are called [Response A3] hereinafter

9. As to Claim 6, Schiek & Schmidt teach subject matter in [Section 3; Section 3.1; Table 1].

For reference purposes, the explanations given above in response to Claim 6 are called [Response A4] hereinafter.

Art Unit: 2825

10. As to Claim 7, Schiek & Schmidt disclose subject matter regarding summing the candidate masks and reconciling the summed candidate masks comprising performing selected operations based on process constraints on splitting the summed candidate masks – [Section 3.2; Section 4].

For reference purposes, the explanations given above in response to Claim 7 are called [Response A5] hereinafter.

11. As to Claim 8, Schiek & Schmidt disclose that the process constraints are selected from specific material type of a layer – [Section 3.2].

12. As to Claim 9, Schiek & Schmidt disclose the following subject matter:

- A method of generating two-dimensional (2D) masks from a three-dimensional (3D) model – [title; abstract];
- Disassembling the 3D model into one or more non-intersecting bodies (i.e., independent bodies) – [Section 4]
- Processing for each non-intersecting body (independent body): generating a topology tree composed one or more nodes, categorizing the one or more nodes of the topology tree, and locating deposition boundaries – [Section 4];
- Processing for each deposition domain: locating candidate masks, and saving the candidate masks in a candidate mask set – [Section 4];
- Summing all candidate masks in the candidate mask set – [Section 4].

For reference purposes, the explanations given above in response to Claim 9 are called [Response B] hereinafter.

13. As to Claim 27, reasons are included in [Response B] given above.

14. As to Claim 10, Schiek & Schmidt disclose the subject matter regarding providing the 3D model that represents a MEMS device in [abstract]

15. As to Claims 11 and 28, Schiek & Schmidt disclose the subject matter regarding combining redundant nodes – [Section 4].

16. As to Claim 12, Schiek & Schmidt disclose the subject matter regarding adjustment the candidate masks can be done with a stepwise optimization sequence of process steps that are capable of producing a model that cannot be produced within a constraints of a specified process – [Section 3.2].

17. As to Claim 13, Schiek & Schmidt teach that “*Specific process details do not enter the algorithm until the final step. Allow most of the algorithm to operate independently of process details and keep the algorithm flexible to process changes*” – [Section 4].

18. As to Claims 14 and 29, Schiek & Schmidt teach the subject matter regarding reconciling the candidate masks in the candidate mask set with target process constraints – [Section 4].

19. As to Claim 15, Schiek & Schmidt teach the subject matter regarding reconciling the candidate masks comprises inverting etching senses of a candidate mask to meet a target process constraint – [Section 3.2].

20. As to Claim 16, Schiek & Schmidt show and teach the subject matter in Fig. 1.

21. As to Claim 17, Schiek & Schmidt teach the subject matter regarding reconciling the candidate masks comprises rearranging order of the candidate masks – [Section 3.2].

22. As to Claim 18, Schiek & Schmidt show and disclose the following subject matter:

- A method of generating two-dimensional (2D) masks from a three-dimensional (3D) model – [title; abstract];
- Analyzing cross sectional topology of a 3D body – [Section 3; Fig. 1];

- Generating a topology tree describing connectivity and relationships between cross sections, the topology tree including one or more nodes and branches – [Section 3; Section 4.2; Fig. 3];
- Processing individual node comprising: calculating a cross sectional area of the individual node, and categorizing the node relative to topological neighboring nodes – [Section 3; Section 3.1; Table 1];
- Processing individual branch comprising: locating depositing boundaries to define one or more deposition zones (i.e., domains) – [Section 3.1];
- Processing individual deposition domains between the deposition boundaries comprising: uniquely identifying (i.e., defining) special process masks (i.e., a mask set) and deposition thickness – [Section 3.1].

For reference purposes, the explanations given above in response to Claim 18 are called [Response C] hereinafter.

23. As to Claim 30, reasons are included in [Response C] given above.

24. As to Claims 19 and 20, Schiek & Schmidt disclose the subject matter in Section 4.

For reference purposes, the explanations given above in response to Claims 19 and 20 are called [Response C1] hereinafter.

25. As to Claim 21, Schiek & Schmidt teach conduction of a simplification of topology trees by combining (i.e., jointing) nodes that topologically connect into one node (i.e., redundant nodes), thereby reducing number of nodes in topology trees (i.e., topology graphs) – [Section 4].

For reference purposes, the explanations given above in response to Claim 21 are called [Response C2] hereinafter.

26. As to Claim 23, reasons are included in [Response A1] given above.

27. As to Claim 24, reasons are included in [Response A1], [Response A2] and [Response A3] given above.

28. As to Claim 25, reasons are included in [Response A1], [Response A2] and [Response A4] given above.
29. As to Claim 26, reasons are included in [Response A5] given above.
30. As to Claim 31, reasons are included in [Response C], [Response C1] and [Response C2] given above.

Response to Amendment and Remarks

31. Applicant's amendments and remarks filed on 01/26/2006 have been reviewed. Applicant's argument filed has been fully considered. Under rules 37 CFR 1.132, assignee should file an affidavit/declaration to overcome the rejection of Claims 1 – 32 based on the paper entitled "A New, Topology Driven Method for Automatic Mask Generation from Three-Dimensional Models" solely authored by the applicant.

Conclusion

32. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to *Sun James Lin* whose telephone number is (571) 272 - 1899. The examiner can normally be reached on Monday-Friday (9:00AM-6:00PM).

Art Unit: 2825

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, *Jack Chiang* can be reached on (571) 272 - 7483. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308 - 7382 for regular communications and (703) 305 - 3413 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308 - 1782.

Sun James Lin
Patent Examiner
Art Unit 2825
February 17, 2006

A handwritten signature in black ink, appearing to read "James Sun Lin", with a stylized flourish at the end.